REMARKS

Examiner J. Mitchell is thanked for the thorough examination and search of the subject Patent Application. Claim 13 has been amended. Claims 1-12 remain canceled per the restriction requirement.

All Claims are believed to be in condition for Allowance, and that is so requested.

Reconsideration of Claims 13-16 and 18-24 rejected under 35 U.S.C. 103(a) as being unpatentable over Yamai (JP 409045691) in combination with Forehand et al (U.S. 5,847,936) and Mars (U.S. 5,795,818) is requested based on Amended Claim 13 and on the following remarks.

Applicant has amended Claim 1 to include matter included in the original Specification and Drawings by not taught or suggested by the cited art. In particular, Amended Claim 13 now reads:

13. (Currently Amended) A semiconductor device package, comprising:

a semiconductor device, said device having been provided with points of electrical contact in an active surface thereof, said points of electrical contact having been provided with fine pitch, high reliability solder bumps, said solder bumps extending from said active surface of said semiconductor device over a height of columns of pillar metal, said columns of pillar metal being in contact with said points of electrical contact provided in the active surface of said semiconductor device wherein said pillar metal comprises two metal layers, and wherein said solder bumps extend over said pillar metal by at least 0.2 microns;

a Ball Grid Array substrate, said BGA substrate having been provided with points of electrical contact over a first and a second surface thereof, said points of electrical contact provided over the second surface of said BGA substrate being connected to interconnect lines provided over the second surface of said BGA substrate;

a solder mask provided over said second surface of said BGA substrate;

said device being positioned over the second surface of said BGA substrate, said fine pitch, high reliability solder bumps facing said second surface of said BGA substrate, providing contact between said fine pitch, high reliability

solder bumps and said points of electrical contact provided over said second surface of said BGA substrate;

electrical contact having been established between said fine pitch, high reliability solder bumps and said points of electrical contact provided over said second surface of said BGA substrate by a process of solder reflow;

said semiconductor device being encapsulated in a molding compound, said molding compound surrounding said device on all sides including said active surface of said device;

contact balls making electrical contact with said points of electrical contact provided over said first surface of said BGA substrate; and

electrical contact having been established between said solder balls inserted into said solder mask provided over said first surface of said BGA substrate and said points of electrical contact provided over said first surface of said BGA substrate by a process of solder reflow.

The amendment to Claim 13 now adds the features illustrated in Fig. 3 and discussed on pages 12-14 of the of the Specification. Specifically, Fig. 3 show the pillar-style solder bumps used in the present invention in cross section. As key features, the bumps comprise pillar sections 36 and 38 that further comprise a barrier metal 36 and the pillar metal 38. Note that the barrier

metal 36 contacts the contact pads 32. In addition, the barrier metal 36 has been etched to align with the pillar metal 38 such that continuous edges are formed comprising the barrier metal 36 and the pillar metal 38. As an additional feature, the solder bumps 40 and 42 are formed overlying the pillars 36 and 38 such that the bumps 40 and 42 overhang the pillars 36 and 38 by at least 0.2 microns.

The above-described features, that of two-metal pillars and of the solder bumps overhanging the pillars by at least two microns, are not taught or suggested by the cited art. In particular, Yamai, Forehand, and Mars do not teach or suggest, separately or in combination, the features of two-metal pillars or of the solder bumps overhanging the pillars by at least two microns. These features are made clear in Applicant's claimed invention as recited in Amended Claim 13. Therefore, it would not have been obvious for one skilled in the art at the time of the claimed invention to have combined the teachings of Yamai, Forehand, and Mars to derive the claimed invention. Applicant therefore believes that Claim 13 should not be rejected under under 35 U.S.C. 103(a) as being unpatentable over Yamai, Forehand, and Mars. In addition, Claims 14-16 and 18-24 represent patentably distinct, further limitations on Claim 13 and shouldn't, therefore, be rejected under 35 U.S.C. 103(a).

Reconsideration of Claims 13-16 and 18-24 rejected under 35 U.S.C. 103(a) as being unpatentable over Yamai (JP 409045691) in combination with Forehand et al (U.S. 5,847,936) and Mars (U.S. 5,795,818) is requested based on Amended Claim 13 and on the above remarks.

Reconsideration of Claim 17 rejected under 35 U.S.C. 103(a) as being unpatentable over Yamai (JP 409045691) in combination with Forehand et al (U.S. 5,847,936) and Mars (U.S. 5,795,818) and further in combination with Pao et al (U.S. 5,931,371) is requested based on Amended Claim 13 and on the following remarks.

As described above, the amendment to Claim 13 has added significant limitations that are not taught or suggested by Yamai, Forehand, or Mars. In addition, Pao et al does not teach or suggest the use of the two-metal pillar or of the solder bump overhang of the pillar by at least 0.2 microns. Therefore, it would not have been obvious for one skilled in the art at the time of the claimed invention to have combined the teachings of Yamai, Forehand, Mars, and Pao to derive the claimed invention as recited in Claim 17 per Amended Claim 13. Applicant therefore believes that Claim 13 should not be rejected under under 35

U.S.C. 103(a) as being unpatentable over Yamai, Forehand, Mars, and Pao. In addition, Claim 17 represents patentably distinct, further limitations on Claim 13 and shouldn't, therefore, be rejected under 35 U.S.C. 103(a).

Reconsideration of Claim 17 rejected under 35 U.S.C. 103(a) as being unpatentable over Yamai (JP 409045691) in combination with Forehand et al (U.S. 5,847,936) and Mars (U.S. 5,795,818) and further in combination with Pao et al (U.S. 5,931,371) is requested based on Amended Claim 13 and on the above remarks.

Applicants have reviewed the prior art made of record and not relied upon and have discussed their impact on the present invention above.

Allowance of all Claims is requested.

It is requested that should Examiner J. Mitchell not find that the Claims are now Allowable that the Examiner call the undersigned at 989-894-4392 to overcome any problems preventing allowance.

Respectfully submitted,

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